REMARKS

Claims 28 and 30-31 stand rejected as indefinite under 35 USC 112, second paragraph.

In the office action it is stated that the phrase "said component is an unsoldered component" is not understood, and the examiner then disputes as "incorrect" the explanation from the earlier response --"unsoldered component means a component that has not been soldered or prior to soldering"-- because Fig. 1 shows the component after soldering. In an attempt to further prosecution, applicants have added new Fig. 3 showing the component prior to soldering. Support for showing the component prior to soldering is throughout the specification. E.g., the specification repeatedly refers to the product before and during soldering (as well as after soldering), and makes it crystal clear that the anti-solder coating is on the component before it is soldered (which it of course must be in order for it to be effective in avoiding solder splash). Examples of such references in the specification are on page 2, lines 5-6 ("on [...] component surfaces not intended for soldering"), on page 2, lines 15-17 ("...which is of decisive importance during pick-and-place processes used in surface-mounting techniques") and on page 3, second paragraph ("for the reduction of solder splash on surfaces [...] not intended for soldering").

Applicants submit that the meaning of "unsoldered component" of claim 28 is crystal clear. Fig. 1 is a soldered component. Fig. 3 is an unsoldered component. The specification has also been amended to state that Fig. 3 is an unsoldered component, i.e., prior to soldering.

The specification has also been amended to include the following explicit explanation with respect to the support structure of claim 30 and the end of the coating of claim 31:

> Figure 1 shows component 1 after it has been soldered to circuit board 7, which is a structure that supports component 1 and thus is considered a support structure. Fig. 3 shows component 1 apart from any support structure. As appears from Figs. 1 and 3, coating 6 has an end at the bottom, adjacent to but not covering solder areas 4.

Applicants submit that all claims fully comply with 35 USC 112, second paragraph.

Claims 1-7 and 27-31 stand rejected under 35 USC 103(a) as being obvious over the Fig. 2 prior art of the specification in view of Higgins.

The object of the present invention is, in accordance with the description, to produce an electronic component for which the adhesion of solder splash or solder itself to surfaces not intended for soldering is prevented to the greatest extent possible.

Solder splashes may greatly reduce the efficiency of an electronic component, in particular, of a radiation-emitting and/or radiation-sensitive electro-optical component, e.g. by short-circuiting the metallic soldering areas 4 of component 1 via solder bridges 13 according to Figure 2.

In the invention an anti-solder coating is in accordance with page 2, paragraph 2, line 2 understood as a coating which prevents solder adherence, i.e. the adherence of solder material, which has been made explicit by amendment herein to all independent claims.

A solder material is a metal or metallic alloy used when melted for uniting adjacent metallic edges or surfaces (cf. an except from Webster's 1913 Dictionary on http://www/hyperdictionary.com/dictionary/solder).

The anti-solder coating is applied to the component before the metallic soldering areas 4 are placed on the conducting traces 8 printed on the circuit board 7 and solder material 3 is melted in a soldering process, that is to say before soldering the metallic soldering areas 4 of electronic component 1 to the conductors 8 of the circuit board by means of melting solder 3. Solder material 3 secures the electronic component 1 to the circuit board 7 after the soldering process. The electrical contact connection of component 1 is achieved via conducting traces 8 and via soldering areas 4 which are metallic and therefore electrically conducting and electrically conductively connected to the conductors by means of the solder material after the soldering process.

The most serious harm caused by solder splashes arising during the soldering process is probably a short circuit of the metallic soldering areas 4 which may result in a complete failure of the electronic component 1.

The examiner bases his rejection of claim 1 under 35 USC § 103(a) on the prior art Higgins et al. U.S. Patent No. 5,639,989 in conjunction with the Fig. 2 prior art of the specification and with an excerpt from Hawley's Condensed Chemical Dictionary.

The Fig. 2 prior art in the specification describes an uncoated component with solder splashes. In particular there is no anti-solder coating arranged in the area between the metallic soldering areas 4.

In Higgins an electronic component is covered with a multi-layer structure after electrically connecting the leads 54 with conductive traces 18 on a circuit board. This can be seen from col. 6, lines 19-47. The invention described in Higgins has the object to shield electronic components, in particular semiconductor components, from electromagnetic interference (EMI). In order to achieve this, additional conductive layers are arranged on the insulating layer with the insulating layer preventing short-circuiting of the electronic component via the conductive layers (col. 5, lines 18 to 23). The conductive layers are necessary to achieve the object of the invention described in Higgins, because in case of missing conductive layers, electromagnetic radiation could not induce currents in the conductive layers, and in consequence, there would be no shielding effects. The insulating layer may be of a material selected from a group comprising a polysiloxane and various other materials. An anti-soldering property of any of these materials is not mentioned. In col. 7, lines 8 to 10, it is suggested that the conductive layer is deposited across the entire assembly, which should not impose any problems due to the underlying insulating layer.

According to the examiner, Hawley's Condensed Chemical Dictionary suggests anti-soldering properties of siloxane material or of a silicone. However, neither the paragraph referring to siloxane nor the paragraph referring to silicone mentions anti-soldering properties of siloxane. Rather, these texts mention adhesive, laminating properties or the use of the materials as a bonding agent. Hence these texts suggest bonding properties, rather than anti-solder properties which would be anti-bonding or anti-adhering properties with respect to solder materials. The independent claims have been amended to make it explicit that the anti-solder coating prevents solder adherence.

Because the component in Higgins is soldered prior to the coating process, there is no insulating layer in the area between the leads 54 on the side of the circuit board. This area, however, is the area where solder splashes and short circuits caused through these solder

splashes are most likely to occur. Hence a person skilled in the art searching for a protective coating in order to prevent short-circuiting via solder bridges arising during soldering between metallic soldering areas would not even consider Higgins, because the coating is absent in the most critical area and because there is no mention whatsoever of anti-solder adherence properties of the insulating layer anywhere in Higgins.

The only property of the insulating layer which could be implied in Higgins is that the insulating layer promotes adhesion to the conductive layer which is arranged on the insulating layer, which conductive layer may include metals like Ni, Co, Fe or alloys (col. 7, lines 37 to 46). These materials are at least partly responsible for the electrical conductivity of the conductive layers following the insulating layer. The conductive layer is crucial for the solution of the problem stated in Higgins. Hence a person skilled in the art reading this document would assume that the insulating layer promotes adhesion to the conductive layers in order to prevent delamination and a decrease in shielding efficiency caused through delamination.

Higgins therefore inherently teaches that the insulating layer promotes adhesion to an electrical conductive layer. Since solder through which electrical contact connection of a surface-mountable component is usually effected is electrically conductive and may also comprise a metal, Higgins teaches the insulating layer being an adhesion promotion layer with respect to solder rather than an anti-solder coating. Hence Higgins' teaching stands in contrast to the teaching of the present invention.

This is confirmed by the corresponding texts in the excerpts from Hawley's Dictionary which mention adhesion properties of silicone or siloxane materials rather than anti-solder properties as stated by the examiner.

Overall, no hint is given in Higgins or Hawley, which suggests coating an electronic component with an anti-solder coating.

Hence, the subject matters of independent claims 1 and 28-31 are not obvious in view of the prior art, taken alone or in combination, and these claims are patentable under 35 USC 103(a).

The remaining claims depend on the independent claims and are allowable with them.

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Respectfully submitted,

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John W. Freeman, Esq.
Reg. No. 29,066

Fish & Richardson P.C.
225 Franklin Street
Boston, MA 02110-2804
Telephone: (617) 542-5070
Facsimile: (617) 542-8906

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